



005892655A

# United States Patent [19]

Grouell

[11] Patent Number: 5,892,655  
[45] Date of Patent: Apr. 6, 1999

[54] **HARD DISK DRIVE HEAT SINK**

[75] Inventor: William L. Grouell, San Ramon, Calif.

[73] Assignee: Sun Microsystems, Inc., Mountain View, Calif.

[21] Appl. No.: 883,847

[22] Filed: Jun. 27, 1997

[51] Int. Cl.<sup>6</sup> ..... H05K 7/20

[52] U.S. Cl. .... 361/690; 361/704; 361/714;  
361/715; 174/16.3; 165/80.3; 165/80.2

[58] Field of Search ..... 361/687, 690,  
361/692, 704, 709, 710, 711; 174/16.3,  
16.1; 165/80.2, 80.3

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

4,414,604	11/1983	Matsui et al.	361/385
4,754,101	6/1988	Stickney et al.	361/818
5,016,139	5/1991	Stopa et al.	361/386

5,204,497	4/1993	Herrick	361/687
5,253,133	10/1993	Guo	360/97.01
5,311,928	5/1994	Marton	165/80.3
5,625,229	4/1997	Kojima et al.	361/697

**FOREIGN PATENT DOCUMENTS**

29601645U1 3/1996 Germany .

*Primary Examiner*—Leo P. Picaro

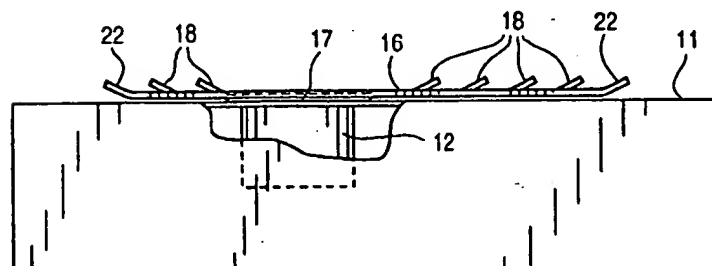
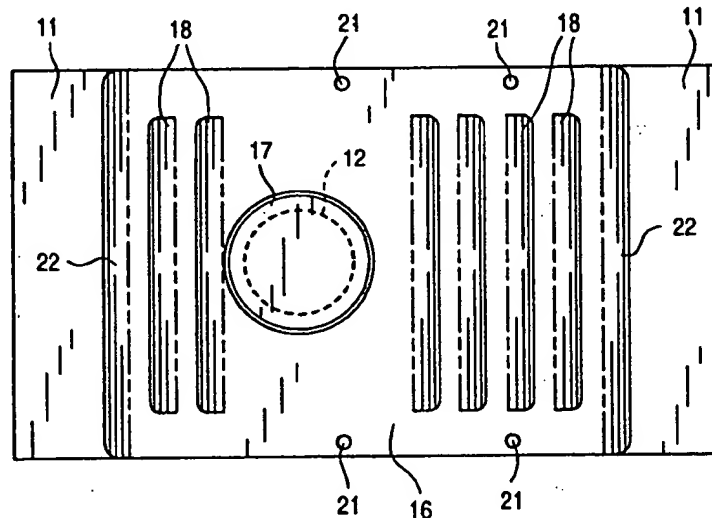
*Assistant Examiner*—Boris L. Chervinsky

*Attorney, Agent, or Firm*—Julian Caplan; Flehr Hohbach Test; Albritton & Herbert LLP

[57] **ABSTRACT**

A plate formed with louvers and a depression to heat engage a hard disk drive motor is attached to such a drive. Heat from the motor is transferred to the plate. The louvers dissipate heat especially if they are in the path of a blower. The plate also protects the user from contact with drive components if touched during installation or removal of the drive while the drive is connected to a computer while electrically energized.

**3 Claims, 1 Drawing Sheet**



09828246-04060